

FORMER 82311560

Table 2 Formulation Component

Principal agent	XA-1	XA-2	XA-3	XA-4	XA-5	XX-1	XX-2
A-1	30	20	15				
A-3				125			
B-1	108	123	131		75	154	
D-1					105.3		105.3
KAYARAD DPHA *6	16	16	16	16		16	
KAYARAD DPCA-60 *7					20		60
I 9 0 7 *8	10	10	10	10		10	
DET X-S *9	1.2	1.2	1.2	1.2		1.2	
Diethylaminobenzophenone					0.1		0.1
Benzophenone					5.0		5.0
Victoria Pure Blue					0.2		0.2
Fine silica	10	10	10	10		10	
Melamine monomer	1.2	1.2	1.2	1.2		1.2	
Hexamethoxy melamine					10		10
KS-66 *10	1.0	1.0	1.0	1.0		1.0	
MEK					45		45

(Note)

\* 6: Dipentaerythritol(penta and hexa)acrylate mixture

\* 7:Dipentaerythritol- ε - caprolactone additive poly-acrylate

- \* 8: Irgacure 907: 2-methyl-1-[4-(methylthio)phenyl-2-morpholino -propan-1-one] made by Ciba Geigy
- \* 9: Diethylthioxanthone made by NIPPON KAYAKU KK
- \* 10: A silicone antifoamer made by Shin-Etsu Chemicals KK

Table 3 Formulation Component(parts by weight)

		H-1	H-2	H-3	H-4
Epicoat 1001	* 1	66	30		
YR-528	* 2		20		
YX-4000	* 3			30	
DEN-438	* 4				30

(Note)

- \* 1: Epicoat 1001: Bisphenol A epoxy resin (containing carbitol acetate, a solid concentration of 75%) made by Yuka Shell Epoxy KK
- \* 2: YR-528: a gum denatured epoxy resin made by Tohto Kasei KK
- \* 3: YX-4000: a bisphenol type epoxy resin made by Yuka Shell Epoxy KK
- \* 4: DEN-438: a phenol novolac epoxy resin made by Dow Chemical Co., Ltd

Assay method:

The resist compositions were each assayed as follows.

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The resist compositions of examples and comparative examples as shown in Table 4 were each applied to the printed circuit substrates (obtained by laminating copper foil on an imide film) by screen printing to dry at 80°C for 20 minutes. Then, the applied membranes were each covered with the negative films and irradiated by an integrated dose of 500mJ/cm<sup>2</sup> of ultra-violet ray from an exposure device to form certain patterns. The membranes were developed with an organic solvent or an aqueous 1 wt% Na<sub>2</sub>CO<sub>3</sub> solution and heated at 150°C for 50 minutes to cure. The substrates thus prepared for test were assayed on the properties in alkali development, soldering-heat resistance, flexibility, heat-deterioration resistance and nonelectrolytic gold-plating resistance. The results are shown in Table 4. The assay methods and the assay standards were as follows:

(1) Development:

The applied membrane was dried at 80°C for 60 minutes, followed by spraying an aqueous 1% sodium carbonate solution of 30°C for developing to assay the development.

○: no visual residue

×: a visual residue

(2) Soldering-heat resistance:

A rosin flux was applied to the test substrate, which was dipped in a melted solder bath of 260°C for 10 seconds. The